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THE KENT INCORPORATED SOCIETY
FOR PROMOTING EXPERIMENTS IN
HORTICULTURE

SUPPLEMENTARY ANNUAL REPORT

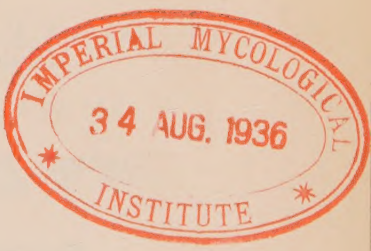
(TWENTY-THIRD YEAR)

GENERAL DEVELOPMENT AND ACTIVITIES

EAST MALLING RESEARCH STATION

EAST MALLING

KENT



1st January, 1935, to 31st December, 1935

Published May, 1936

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H. V. TAYLOR, Esq., O.B.E., A.R.C.S., B.Sc., Ministry of Agriculture and Fisheries.

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Professor Sir ROWLAND H. BIFFEN, M.A., F.R.S. (*ex-officio*).

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R. V. HARRIS, B.Sc. (Lond.), A.R.C.S., D.I.C.

STAFF

Director : RONALD G. HATTON, C.B.E., M.A. (Oxon), V.M.H.

Assistant Director : H. WORMALD, D.Sc. (Lond.), A.R.C.S., D.I.C.

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Pomology : R. G. HATTON, C.B.E., M.A. (Oxon), V.M.H.
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W. A. BANE, B.Sc.Hort. (Reading).
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Miss M. E. RENWICK, B.Sc.Hort. (Reading).
Lab. Assistant : J. A. JELL.

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Propagation : R. J. GARNER, N.D.H., Dip. Hort. Sci. (Reading).
A. W. WITT, N.D.H. (*Consultant*).
D. H. HAMMOND.

Marketing Investigations : A. C. PAINTER.
Miss B. L. WATES, B.Sc.Hort. (Lond.).

Hops : F. H. BEARD, Hort. Dip. (Wye).

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Miss J. L. EDGAR, B.Sc. (Lond.).
Lab. Assistant : Miss J. S. PLACKETT.

Plant Physiology : M. C. VYVYAN,* M.A. (Cantab.).
H. L. PEARSE, Ph.D. (Lond.), A.R.C.S., D.I.C., of the Imperial College of Science and Technology.
Lab. Assistant : P. HILLS.

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Lab. Assistant : R. CORNFORD.

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R. V. HARRIS, B.Sc. (Lond.), A.R.C.S., D.I.C.
Miss I. LAUDER-THOMSON, B.Sc., *Special Assistant, Strawberry Work.* (Resigned September 1935.)
Lab. Assistant : Miss K. CORNFORD.

Entomology : A. M. MASSEE,* D.Sc. (Lond.), F.R.E.S.
R. M. GREENSLADE, B.Sc., A.R.C.S.

Insecticides and Fungicides :

Chemistry : H. SHAW, M.Sc.Tech., Ph.D.
Lab. Assistant : R. N. PIERCE.

Entomology : W. STEER, B.A. (Cantab.).
F. J. D. THOMAS, B.Sc., A.R.C.S., *Special Assistant.* (Resigned May 1935.)
R. G. GAMBRILL, *Recorder.*

Mycology : M. H. MOORE, Dip. Hort. Sci. (Reading).
H. B. S. MONTGOMERY, B.A., *Special Assistant.*

* Recognized teacher of the University of London, for purposes of Higher Degrees.

Guide Demonstrator and Exhibitions Officer: H. C. CHAPELOW, *Meteorological Records.*

Advisory Officers in Commercial Fruit Growing to the Kent Education Committee stationed at East Malling Research Station: W. G. KENT, N.D.H. and C. R. THOMPSON.

ADMINISTRATION.

Secretary: C. T. ROYLE.

Book-keeper: P. R. WOOD.

Director's Personal Secretary: Miss L. E. ALEXANDER.

Clerical Staff: Miss I. M. FISHER, Miss E. M. LAWSON, Miss J. M. COY, Miss J. M. CRAYFORD, Miss M. RAY and R. A. POTTER.

VISITORS.

Visits may be paid to the Research Station on any weekday *by appointment* (Saturday afternoon under exceptional circumstances only).

Passenger Station: East Malling Halt (Southern Railway).

Goods Station: Aylesford (Southern Railway).

Bus Services:

FROM MAIDSTONE by the Maidstone and District Motor Services Limited, every 20 minutes from Maidstone to East Malling Church.

FROM LONDON a regular service of Maidstone and District Coaches from the London Coastal Service Limited, Victoria Station, may be of assistance to Visitors. The Coaches call at East Malling on certain inward and outward journeys.

For Visitors coming by road DITTON CORNER on the main London-Maidstone Road (with Red Lamp Danger Signal) is the turning to the Research Station.

Telephone: Aylesford 7229.

Telegrams: Research, East Malling.

THE IMPERIAL BUREAU OF FRUIT PRODUCTION

is accommodated at East Malling Research Station.

STAFF.

Director: R. G. HATTON, C.B.E., M.A. (Oxon), V.M.H.

Chief Officer: D. AKENHEAD, M.A. (Oxon), B.Sc.Agric. (London).

Assistants: G. St. CLAIR FEILDEN, B.A. (Oxon).

G. K. ARGLES, Dip Hort. (Wye), A.I.C.T.A. (Appointed August 1935.)

Clerical Staff:

Secretary: Miss R. M. ALLISTON. (Resigned June 1935.)

Miss F. H. WHITEHEAD, Miss M. B. ROGERS and Miss M. M. DURLING (appointed October 1935).

Telephone: Aylesford 7188.

GENERAL DEVELOPMENT AND ACTIVITIES

EDITORIAL.

The rapid development of the Station's activities has in no way slackened, and the loss of two of our Institution's oldest and most indispensable friends and workers, the late Lord Cornwallis and Dr. Knight, referred to elsewhere, has called for a redoubling of energy and enthusiasm on the part of all those of us left to carry on. In times of such adversity, the opportunities arise for others to prove themselves. Every member of staff has voluntarily made his and her contribution to filling up the inevitable gap and no one would have felt more encouraged by the renewed spirit of team work which displayed itself throughout the year in the revision of our research programme, in the launching of new projects, in the winter research discussions and in the social events than Dr. Knight who took such an active part therein. The same spirit has animated the administrative staff.

Meanwhile, thanks to the sympathetic understanding of our growing Station's needs, we have been enabled to maintain the normal logical expansion of our constitution, our programme and our field lay-out, despite the serious temporary setback to our financial position brought about by the devastating frost of 16th-17th May.

The year has seen the amalgamation of our grants in aid from Government sources into a single grant from the Development Fund through the Ministry of Agriculture. For the approval of this suggestion we are most grateful, since it not only removes a source of great anxiety but makes for simplicity in accounting and administration. Despite this change, we are not forgetting the trust implicitly placed with us when the late Empire Marketing Board so generously recognized our work. The scheme for receiving a limited number of graduate students—especially from overseas—is now bearing considerable fruit and we find the presence of this fresh point of view mutually advantageous.

We are, too, maintaining our contacts with the various Dominions by arranging exchanges and visits, whilst the number of overseas visitors and of those seeking Associate Membership of our Institution has rapidly increased.

Meanwhile, as the steady increase in our Associate Membership and the phenomenal expansion of our annual roll of visitors show, the grower at home is taking advantage more and more each year of what the Station has to offer. The practical demonstrations and conferences continue to be greatly appreciated and to link the grower and his problems more intimately with the Station's investigations.

The Station has attempted to turn the disastrous frost of May into an opportunity for urging a much more comprehensive study of local climatology in relation to fruit plants, especially in relation to frost damage and windbreaks.

The substantial figure now contributed through our Membership Scheme to our research and educational activities is a most important factor in the Institution's progress. For a living growing organism, additional nourishment is not infrequently necessary and the investigation of every project opens up some new avenue which is worthy of exploration. It cannot be too strongly urged that this self-help is the surest way of ensuring normal development and it is hoped that this source of revenue may not only be maintained but considerably expanded.

We cannot close these remarks without wishing continued good health and happiness to one of our oldest members of staff, Mr. A. W. Witt, whose retirement from full-time service is chronicled elsewhere.

OBITUARY.

The Governing Body and the Executive Committee sustained a great loss in the death of Lord Cornwallis and everyone at the Station felt that they had lost a true friend and ready counsellor. From the time when Wye College was considering the founding of a fruit experiment station, Lord Cornwallis was encouraging the idea not only by material assistance but by giving his advice and using his influence with the County authorities to play their part in the finance of the Station.

Despite all his other public work in the County, he rarely missed the quarterly Executive meetings at East Malling, and when any matters of particular importance arose, his advice was always sought and readily given. Few people appreciate the amount of detailed thought which an event such as our twenty-first Anniversary involved, and they will certainly never realize the part played by Lord Cornwallis in helping to make the arrangements for that occasion run smoothly in every detail. Only a week or so prior to his fatal illness, although obviously a sick man, he willingly discussed in detail all the important aspects of the revision of the Station's Articles of Association with his usual clarity of mind. His loss has left a gap that will indeed be difficult to fill.

Another old friend whose passing we most regretfully record, Mr. Selby Smith, of Hall Place, Barming, was one of our original subscribers and for many years a member of the Fruit and Hop Sub-Committees.

As has already been fully recorded in last year's Annual Report, the Station suffered another severe blow by the untimely death of its Assistant Director, Dr. R. C. Knight, in January 1935.

COMMITTEES.

On his retirement from the Kent County Council, Mr. F. W. Payne ceases to be one of our Appointed Members to the Governing Body, but we are glad to think that we shall be retaining his interest as an Associate Member. We extend a very warm welcome to his successor, Lord Cornwallis, M.C., who is now the Chairman of the Kent County Council.

We regret that Mr. W. R. Burrell, the representative from West Sussex County Council, has resigned, and we record our thanks for his help over a number of years. We are pleased to learn that Gen. Sir Ivor Maxse, a very old friend of the Station, has been appointed to fill the vacancy.

The following N.F.U. Members have relinquished their office as representatives of the Kent Branch N.F.U. : Messrs. T. D. Harris, T. T. Harlow, J. Kitchin and W. Rogers, and we wish to record our very grateful thanks for their services. They are succeeded by Mr. Arthur Amos, Sir Amberson B. Marten, Mr. D. J. Moor, and Mr. J. F. Towner, to whom we extend a welcome.

Mr. R. V. Harris was elected Staff Representative for the year.

Fourteen Committee meetings were held, four being Executive Meetings. The Executive Committee again unanimously elected Mr. P. Manwaring as Chairman with Mr. S. W. Mount, Vice-Chairman, and Mr. T. Neame, Chairman of Finance. The Fifteenth Annual General Meeting and Members' Day was held on 16th May, full details of which appear later in the Report.

All Sub-Committees have met once during the year. The Hop Sub-Committee (Chairman, Mr. J. D. Maxted) expressed approval of the arrangements to hold the meeting in August and hoped this could be continued. A recommendation was passed to the Executive Committee to make available a small area of land for the testing of new non-carriers of Mosaic disease.

The Fruit Sub-Committee (Chairman, Mr. C. S. Smith) had an all-day meeting on the 26th November when, in addition to the annual reports and inspection of plots, an interesting discussion took place on the question of overworking Newton Wonder apple trees. Owing to the loss of fruit following severe frosts in May, a summer meeting was not held.

A special Sub-Committee appointed to deal with the revision of the Articles of Association has met on several occasions.

Revision of Articles of Association.

During the last few years it has become apparent that the Articles of Association were very much out of date. These were drawn up when the Station was in its infancy, and with the rapid development of its activities in the past few years, the necessity arose for the position to be reviewed.

Accordingly, a special Sub-Committee was appointed in June to consider the existing anomalies and to make recommendations to the Executive Committee.

The Sub-Committee reported that, with the rapid growth of the Research Station, and the expansion of its interests, it was desirable to widen the representation of scientific and practical bodies. It was recommended that with the approval of the Ministry of Agriculture and Fisheries, the following bodies should be approached with a view to their being represented directly on the Governing Body :

The University of Bristol.
The University of Cambridge.
The John Innes Horticultural Institution.
The Imperial College of Science and Technology.
The Royal Society.
The Royal Horticultural Society.
The Central Council of the National Farmers' Union.

It was also recommended that the Associate Members should have two representatives elected at an Annual General Meeting, and further, that should the membership increase to over 2,000 members, an additional members' representative should be elected for every 1,000 members.

At the time of going to press the final draft of the revised Articles has not yet been completed, but all the bodies who have been approached have confirmed their willingness to nominate representatives, and in thanking them we appreciate the honour which has been paid to the Station.

The Annual General Meeting and Associate Members' Day.

The Annual Meeting took place on Thursday, 16th May, 1935. The Fifteenth Ordinary General Meeting of the Society was held in the morning in the large packing shed at Ditton Laboratory by kind permission of the authorities, and was attended by 130 members. Mr. P. Manwaring was in the Chair and the Director, Mr. R. G. Hatton,

presented the Twenty-second Annual Report and Supplement (1934) and Mr. T. Neame, the Finance Chairman, presented the Balance Sheet for the year ended 30th September, 1934. These were approved.

The Ninth Annual Meeting of Associate Members began with luncheon in the large packing shed, Mr. P. Manwaring presiding over a company of some 360 members and guests. The principal speakers were Captain the Hon. W. S. Cornwallis, M.C., Mr. H. E. Dale (Ministry of Agriculture), Sir David Chadwick (Imperial Agricultural Bureaux), Mr. W. R. Elgar (Kent Agricultural Education Sub-Committee), and Mr. J. M. Robertson.

After luncheon the members were divided into eight parties and were conducted by guides round the experimental plantations. Some of the chief points of interest in the tour were the apple manurial experiments, the strawberry trials, the new " frame-working " methods of top-grafting, and the tree-injection investigations. At the end of the tour tea was served in the large packing shed.

Finance.

A general statement of the Research Account and the Experimental Farm Account for the financial year 1st October, 1934, to 30th September, 1935, covering the main items of expenditure is shown below.

During the year we received the official confirmation for the merging of the reduced grant from the late Empire Marketing Board (" B " Account) with the existing Ministry of Agriculture block grant (" A " Account). This took place as from 1st April, 1935.

In order to simplify the statements, the accounts for the six months' period of the " B " Account (October 1934 to March 1935) have been combined with the " A " Account for the year October 1934 to September 1935. Any grants received for special research purposes such as the Agricultural Research Council grant for Insecticides and Fungicides Investigations are not, of course, included in these figures. The Bank overdraft at 30th September, 1935, was £2,880 17s. 2d., against a figure of £4,075 16s. 1d. at 30th September, 1934.

While the research grants have been maintained, the disastrous frosts of May 1935 have had a very serious effect on the position of the Farms. The total loss was estimated at the time at approximately £6,000, and while the receipts from the Soft Fruits were slightly better than anticipated, there has been a complete loss of Hard Fruit Crops. Fortunately the loss will be spread over two years. The large carry-over of fruit on 1st October, 1934, which was sold during the current financial year, has enabled the Farm to pay its way up to 30th September, 1935. The effect of our losses, however, will be felt during the first six months of 1936.

We should like to record the fact that but for the Committee's instructions for rigid economy which were issued in June last, the losses would have been heavier. It will be realized that normal changes on our Farm for general upkeep were withheld so that these become an additional liability to be met during the ensuing years.

The Agricultural Research Council renewed their special grant for the Investigations on Insecticides and Fungicides, and Imperial Chemical Industries, Ltd., through its Research Committee, have again provided grants for assisting this work.

The Committee wish to record their grateful thanks for the continuance of the research grants from County Councils and other Bodies. The Kent County Council, East Sussex County Council and West Sussex County Council have renewed their grants, and special thanks are due to the West Sussex County Council who have been able this year (1935-6) to restore the cut made some few years ago. Grants have also been

received for the first time this year from the Surrey County Council and the Essex County Council. Imperial Chemical Industries, Ltd. and the United Potash Co. have continued their grants towards the general research work.

As reported last year it has been possible to continue the work on the investigation of Walnut Culture through the generous grant provided by the Royal Horticultural Society and we are also grateful to the Royal Agricultural Society of England for providing further funds to carry on the investigation until September next. The work will have to be severely restricted after that date unless additional funds become available.

Research Account.*

1st October, 1934, to 30th September, 1935.

	£	s.	d.		£	s.	d.
Debit Balance E.M.B. Account brought forward from 30.9.34	48	6	6	Contributions from Public Bodies	417	10	0
Research and Administrative Salaries and Superannuation ..	11,592	8	5	Grant from Ministry of Agriculture	13,948	0	0
Laboratory Expenses and Equipment	669	7	5	Sundry Receipts	357	14	11
General Maintenance Expenses ..	2,440	10	11	Balance (being excess of expenditure over income)	27	8	4
	£14,750	13	3		£14,750	13	3

Experimental Farm Account (including Newgates Field).

1st October, 1934, to 30th September, 1935.

	£	s.	d.		£	s.	d.
Valuation as at 30.9.34	10,803	13	7	Balance in Hand, Newgates Account at 30.9.34	192	8	8
General Farm Wages	5,659	2	2	Valuation as at 30.9.35 ..	9,299	1	6
Manures and Sprays	321	15	9	Maintenance Grant—Ministry of Agriculture	1,800	0	0
General Hop Expenses	754	4	8	Sundry Contributions	509	18	11
General Expenses	1,900	6	5	Sales of Produce, Crops, etc. ..	7,964	17	0
Balance in Hand	327	3	6				
	£19,766	6	1		£19,766	6	1

Membership Scheme.

The membership on 31st December, 1935, was 1,239, being an increase of 101 members since December of the previous year. The number of new members registered was 149, and 48 memberships have lapsed for various reasons during the year. The steady increase in numbers is encouraging but in view of the many calls on this fund it is hoped that a total of 2,000 may soon be reached. As mentioned in the report last year, the fund is now taking such a definite part in helping to bear the expenses of the research work, that it is essential not only to maintain our existing membership but to ensure a steady increase.

The Committee takes this opportunity of thanking those members who have so kindly introduced new friends. A detailed statement of the Membership Fund is given below.

* This Account does not include any special grants such as the grant from the Agricultural Research Council, etc., etc.

Associate Members' Fund.

Receipts and Payments Account for the Year ending 30th September, 1935.

	£	s.	d.		£	s.	d.
To Contributions to Salaries ..	526	4	5	By Balance at 30th September, 1934	1,392	14	8
,, Stationery, Postages and General Office Expenses	100	10	11	,, Donations	83	14	0
,, Part cost of Printing and Postage on Annual Report ..	157	8	6	,, Subscriptions	1,409	0	6
,, Members' Day Expenses ..	124	4	5	,, Sale of Spray Calendars ..	2	17	1
,, Contribution to Soil Sterilizer (Strawberry Work) ..	35	0	0	,, Repayment of Advance on Kiln Field	475	14	5
,, Contribution to Loud Speaker Equipment	41	6	6				
,, Contribution to cost of Photographic Studio	217	7	9				
	1,202	2	6				
,, Balance of the Fund at 30th September, 1935	2,161	18	2				
	£3,364	0	8		£3,364	0	8

The distribution of stocks has again met with general approval but unfortunately it has not been found possible to meet all demands. May we again remind our members that all requests for surplus material should be received *prior to the closing date* in October.

Development and Endowment Fund.

The Trustees have made it possible for a further 12 acres of land to be made available to the Research Station, an opportunity having occurred early in the year to purchase land adjoining existing properties. This was considered a very good way of investing funds in the hands of the Trustees. The land was occupied in March 1935 and contains approximately 3 acres of plums which were inter-planted with clonal Sovereign strawberries, and 9 acres of open land which has been cropped with oats for the first year.

The Committee wish to record their appreciation of the valuable guidance and help which the Trustees have given during recent years in the provision of lands essential to the normal development of research activities.

Land and Buildings.

The economies considered necessary on the Farm due to the frost damage prevented the carrying out of any of the usual plans for the gradual improvement and development of the Farm Buildings and Equipment. All the property has been maintained in good order and the cottages have been re-painted during the year. The main approach road was given a coat of tar and the surface is satisfactory.

A new office has been built for the Director ; this has not only enabled an adjustment of the adjoining rooms to be made so that an office has become available for the Assistant Director, but has also improved the frontage of the Manwaring block.

The facilities for dealing with any outbreak of fire have been very thoroughly reviewed and we are indebted to Mr. J. Hillier French, Chairman of the Maidstone Fire Brigade Committee, Chief Officer Mr. W. A. Wainscot and the Royal Insurance Co. Ltd., for their advice in helping to bring our equipment up to date. Two lengths of fire hose

have been purchased and an additional water-main point for the stand-pipe has been provided near the new packing shed. Additional extinguishers have also been added to the Research Buildings.

STAFF.

Before the year was out, the Director received an invitation from the Union Government of South Africa to visit that country and advise on certain problems of horticultural research. We much appreciate the compliment paid, through him, to the work of our Institution and the opportunity which the visit will afford for establishing additional contacts overseas. Mr. and Mrs. Hatton sailed on 16th January and hope to be back early in April after eight weeks concentrated travel in the Union. They set out with the best wishes of the Committee and Staff for a successful and interesting tour after exchanging the rigours of winter for a South African summer.

We referred in the Report last year to the sad death of our Assistant Director, Dr. R. C. Knight, who died in January 1935. Dr. H. Wormald was appointed to succeed him. Everyone was glad to see his long experience and signal services to Plant Pathology thus recognized. Our best wishes are with him in his new responsibilities.

During the year Mr. M. C. Vyvyan, now senior member of his Section, was appointed a recognized teacher of the University of London in Plant Physiology for the purposes of Higher Degrees.

We accord a very hearty welcome to Dr. H. L. Pearse who was appointed in July by the Imperial College of Science and Technology, South Kensington, to continue the work in the Physiology Section in the place of the late Dr. R. C. Knight.

Mr. A. W. Witt, who has been connected with the Station since 1919, retired in September on reaching the age-limit. Always young in spirit, full of enthusiasm and optimism and ready to give generously of his wide practical experience, he was an ideal collaborator with Dr. Knight in exploring the problems of propagating our woody plants. We are pleased to say, however, that we are not entirely losing his services, and we hope for many years to come he will be able to give us advice and the benefit of his long experience.

We wish to congratulate Dr. A. M. Massee on the degree of Doctor of Science (Zoology) which has been conferred on him by the University of London.

We were sorry to say " Good-bye " to Miss I. M. Lauder-Thomson who retired in September on her marriage to our marketing officer, Mr. A. C. Painter. Miss Lauder-Thomson has given valuable assistance to Dr. Wormald with the Strawberry Investigations during the last few years. We wish Mr. and Mrs. Painter every happiness.

Miss B. L. Wates joined the pomological staff in April to assist in the recording work ; she has since been transferred to the Marketing Section to assist in the additional work which the rapid development of this side of the Station's activities and the provision of gas storage chambers have entailed.

Mr. F. J. D. Thomas, who came to us as a temporary assistant (Insecticides) left to take up a permanent post in May. In wishing him every success, we want to thank him for the good work he contributed to an untiring section.

Mr. G. A. Brett came in May for a period of five months to assist Mr. W. Steer in the Insecticide-Fungicide Section and to help in various aspects of the work on the biological testing of insecticides. We thank him for his assistance over a very busy period.

On the administrative staff Miss M. E. Day and Miss J. Burgess have left on securing other appointments and we wish them every success in their new work. Miss M. Ray and Mr. R. A. Potter have been appointed to this Staff.

We also welcome Messrs. R. N. Pierce and J. A. Jell who have been appointed as laboratory assistants.

To the great regret of the Staff not only of the Imperial Bureau of Fruit Production but of the Research Station, Miss R. M. Alliston resigned on 30th June, 1935.

It was decided to rearrange the Bureau Staff and to strengthen the technical side. Accordingly, Mr. G. K. Argles, late of Trinidad and Palestine, was appointed as technical assistant in August, and at the end of October Miss M. M. Durling joined the clerical staff.

Mr. C. R. Thompson from Long Ashton took up an appointment with the Kent Education Committee in September, as assistant to Mr. W. G. Kent, adviser in commercial fruit-growing. Mr. Thompson is sharing Mr. Kent's office in the E.M.B. Building and we take this opportunity of extending him a hearty welcome.

Postgraduate and Overseas Workers.

Two postgraduate workers and six members of Staff are now registered as candidates for higher degrees at the University of London, and two other postgraduate workers have been registered as " internal students " of the University.

During the year we have had nine long period and twenty-four short period students working here, eight of whom are still with us.

Miss J. Hearman, who came to us from Australia in December 1933, has nearly completed her studies of the behaviour of the Northern Spy rootstock.

Mr. A. F. de Wet, Research Officer in Pomology at Stellenbosch University, returned to South Africa in July after a nine months' stay. We were fortunate in being able to make this contact with horticultural research work in South Africa through Mr. de Wet, who, whilst studying our methods of field experimentation and propagation technique, found time to render valuable assistance to members of Staff in carrying out their investigations. Two accounts of such investigations were printed in the Annual Report for 1934.

At the special request of the Imperial Council of Agricultural Research, Simla, India, we received Dr. P. K. Sen for two years' intensive study prior to taking up his post as Mango Research Officer. We offer a hearty welcome to Dr. P. K. Sen, to Mr. D. N. Srivastava also from India and to Mr. W. T. Chang from China, who are undertaking postgraduate work here ; also to Mr. J. H. Brair and Mr. F. Forster, both from Palestine, who are assisting the Entomology and Pomology Sections respectively with voluntary work.

A special word of thanks is due to Mr. B. G. Levy, B.A., for a year's voluntary work, first with the Pomology Section and later with the Bio-chemistry Section, and to Mr. C. E. Cornford who returned here temporarily after taking his B.Sc. degree in London, and has been doing voluntary work in connection with the preparation of a comprehensive report on frost damage at home and abroad.

We should also like to take this opportunity of expressing our grateful thanks to the following for much useful help in recording during the past season : Mr. K. N. Bhandari (India), Miss M. E. King (Cambridge), Miss R. F. Stern, Miss J. Annis (Oxford), Mr. A. W. Mayhew, Mr. C. E. R. Gibbard, Miss J. H. ter Kuile (Wageningen, Holland), and Miss M. Beer (Reading).

Staff Meetings for Research Discussion.

Eleven research discussions were held in the spring of 1935. At these meetings the whole research programme of the Station was reviewed, section by section, and revised.

Four very successful discussions were held in the autumn 1935. These took the form of symposia on the following subjects: "Methods for preventing frost damage", "Die-back in plums and cherries", "Incompatibility between stock and scion", and "Biennial Bearing". In the last two the Imperial Bureau of Fruit Production collaborated by providing a review and list of the literature.

We were glad to welcome Mr. M. B. Crane of the John Innes Horticultural Institution at the symposium on incompatibility.

Social Activities.

The Christmas Supper Party and Concert was held in the old packing shed on Monday, 28th January, and as usual proved to be a most popular function. Four cricket matches were played during the season, while two others were spoiled by wet weather. As usual the Manwaring game was washed out by rain. Three matches were won and one was lost. A very enjoyable game was played against an R.H.S. XI at Wisley. The Research Station won after a very hard fight. Another very enjoyable game was played at East Malling against Mr. Raymond Wickham's Brenchley XI. The game ended in our favour. The "local Derby" against the village XI resulted in our only loss.

Two very enjoyable games of hockey were played on the West Malling Hockey grounds.

The hard tennis court was much in demand throughout the season and one very successful tournament was organized.

The summer outing to Hastings on 25th July proved a great success, the programme including a tour of Bodiam Castle, a visit to the open-air swimming pool at Hastings and athletic sports on the cliffs.

Collaboration.

Physiology.

We are glad to think that the close collaboration with Professor V. H. Blackman and the Physiological Department of the Imperial College of Science which was broken off by the sudden and tragic death of the late Dr. R. C. Knight, has now been renewed by the arrival of Dr. H. L. Pearse who, whilst remaining on the staff of that institution, is now engaged in full-time work here in collaboration with our Physiology Section.

Plant Breeding and New Varieties.

The joint work in the trial of new seedling hop varieties has been continued in collaboration with Professor E. S. Salmon and Mr. A. H. Burgess of Wye College.

Mr. M. B. Crane of the John Innes Horticultural Institution has continued to collaborate in our rootstock breeding work and has also sent us a number of new blackberry seedlings for trial. Mr. D. Boyes of the Horticultural Research Station, Cambridge, has sent a number of new strawberry seedlings for trial.

Insecticides and Fungicides.

Mr. W. Steer has continued to collaborate with Dr. F. Tattersfield of the Department of Insecticides and Fungicides at Rothamsted in a joint piece of biological work on the properties of Derris Root.

In carrying out a systematic survey of the ovicidal properties of various tar oils and related materials, Dr. Shaw and Mr. Steer have worked in close collaboration with the Fuel Research Station, Greenwich, and the Chemical Research Laboratory, Teddington. The institutions have supplied raw materials and pure chemicals, have carried out technical distillations, and have given valuable advice and suggestions.

Plant Pathology.

Mr. M. H. Moore and Mr. T. N. Hoblyn have collaborated with Mr. H. Fraser and Mr. O. G. Dorey of the East Anglian Institute, Chelmsford, in an investigation into the causes of branch-blistering of apple trees in Essex.

In collaboration with Dr. Berkeley of the Dominion Laboratory of Plant Pathology, St. Catherines, Ontario, Canadian peaches, which had received various treatments against Brown Rot, were examined for the incidence of the disease, in order to ascertain the possibility of profitably importing peaches from Canada.

Biochemistry.

The biochemistry section is collaborating with Professor R. Robinson of Oxford University in a survey of the organic constituents of fruit trees. Mr. Marsden, of the Imperial College of Science, is co-operating with the section in an attempt to make the polarographic method suitable for routine analysis. Dr. Hulme, of the Ditton Laboratory, is collaborating in an investigation of the effect of tree injection on the organic composition of the fruit and its keeping qualities.

Pomology and General.

The mosaic-free raspberry cane nurseries at the County Farm Institutes of Kent, East and West Sussex, are being well maintained under the care of Mr. R. Hart, Mr. G. C. Johnson and Mr. F. W. Costin. The daughter nursery of clonal strawberries established at the East Sussex Farm Institute, Plumpton, under the care of Mr. G. C. Johnson, has given a good crop of satisfactory runners, and will be continued and enlarged.

Mr. R. T. Pearl of Wye College has provided material from scion-rooted cordon apple trees of a number of varieties on No. IX rootstock for microscopic examination of anatomical structure.

Collaboration has been maintained with Dr. W. Goodwin and Mr. B. S. Furneaux of Wye College in connection with the Fruit Soil Survey.

A survey of frost damage carried out by means of a questionnaire and visits to farms in Kent and Essex brought us into contact with many of our members.

Owing to the almost complete absence of hard fruit here on account of the frost, it was found possible to assist Ditton Laboratory by allowing our marketing staff to undertake the sorting and packing of some 10,000 bushels of apples for their ship's hold and gas storage experiments.

Outside Trials, etc.

The Entomological Section again conducted trials on the control of Apple Blossom Weevil and of Codlin Moth at Kiln Field, East Malling, and we would like to express

our grateful thanks to Mr. H. B. Weston for providing us with facilities for carrying out these trials in his plantations.

Mr. Arthur Amos of Spring Grove, Wye, and Mr. Thomas Neame of Macknade, Faversham, have continued to maintain their commercial cane nurseries of mosaic-free Lloyd George raspberry, and runner nurseries of our clonal selections of Royal Sovereign strawberry.

Messrs. J. Edmonds & Son, Allington, Maidstone, have planted up for us a series of experimental pear trees on different quince stocks and clonal pear stocks. Mr. T. Neame, Faversham, has planted up a series of apple trees on different stocks for an outside trial in distances of planting.

A spraying trial against bacterial canker in cherries has been organized in collaboration with Mr. W. G. Kent, and with Dr. W. M. Ware and Mr. S. G. Jary of Wye College, at Harville, Wye, by kind permission of Messrs. A. B. & J. Long. Surplus trees from our own rootstock trial of sweet cherries, kindly planted out for us at Spriver's Farm, Horsmonden, by Mr. P. Manwaring in January 1930, have now made considerable growth. These were twice visited during the year for observation and recording.

Experiments in the control of chlorosis in apple and pear have been started by the biochemistry section in co-operation with members of the College staff at the Swanley Horticultural College by kind permission of Dr. K. Barratt. Similar experiments, principally on cherries, have also been started in the Sittingbourne area on material kindly supplied by Mr. Leslie Doubleday.

Mr. D. J. Moor, Nichol Farm, Teynham, has planted out a small trial of our Morello cherries on five of Mr. Grubb's layered mazzard stocks.

We are grateful to all these growers for their interest and collaboration.

Finally, we should like to thank Mr. Spencer W. Mount, Mr. T. Neame, Mr. W. Brice and Mr. E. F. Guthrie for affording Miss Wates the opportunity for widening her experience in their Pack houses.

Advisory Work.

Correspondence.

Our records show a total of 1,653 written replies to enquiries during the year. Of these Kent provided 455, East and West Sussex 144, Essex 82 and Surrey 48. It is interesting to note that 763 enquiries were received from other parts of the United Kingdom apart from the four counties mentioned above. Overseas enquiries amounted to 161 exclusive of those which were referred direct to the Imperial Bureau of Fruit Production. A feature of this year's correspondence has been the large number of enquiries we have received on the subject of walnut culture, 45 letters from 22 different counties having been dealt with. This was due in no small measure to the widespread interest aroused by the walnut exhibit at the Royal Horticultural Society, reference to which is made elsewhere in this Report. In addition to the written replies to enquiries, mention should be made of the increasing use of the telephone by enquirers, especially during the spraying season.

We should like to draw the attention of correspondents who send us specimens of diseases and pests to the importance of packing specimens in such a way as to arrive in as fresh a condition as possible. Specimens should be posted early in the week so as to avoid having to remain in the post over the week-end.

Visits.

The number of advisory visits paid by members of staff continues at about the same figure, the year's total amounting to 177 as against 184 in 1934 and 179 in 1933. Of these 118 were visits paid to growers in Kent. We should like to take this opportunity of acknowledging our gratitude to Mr. W. G. Kent, Mr. R. Hart and Mr. B. S. Furneaux for their never-failing kindness and co-operation.

Mr. Kent and Mr. Thompson accompanied Mr. Grubb and Mr. Harris on their annual visit of inspection to the mosaic-free raspberry cane nurseries in Kent. Mr. Grubb and Mr. Harris also visited the cane nurseries in East and West Sussex and inspected them for " mosaic ".

In July Mr. Grubb and Mr. Rogers visited Stokeclimsland, in Cornwall, to survey plantations of East Malling virus-free raspberries and strawberries. The result was distinctly encouraging, the proportion of infected plants discovered being very small. Subsequently, under the guidance of Mr. H. W. Abbiss and Mr. E. Beckley, visits were paid to the County Demonstration Plot at Ellbridge, and to four or five growers of raspberries and strawberries. An interesting sight was a large number of magnificent cherry trees, carrying fine crops. On the three days following, visits were paid to the Devon County Demonstration Plot at Bere Alston, to Seale Hayne Agricultural College, Newton Abbott, to Capt. R. Wellington, Hele, Devon, to the Somerset Farm Institute, Cannington, and to two large growers in Hampshire.

Mr. M. H. Moore again judged at the Imperial Fruit Show, and with two other members of staff at the Sittingbourne Commercial Fruit Show, and Mr. W. A. Bane judged in the Buckinghamshire Orchard Competition.

Lectures, Demonstrations and Conferences.

Lectures.

Twenty-five lectures were given by various members of the Staff in the course of 1935. Of these eighteen were given under the Ministry of Agriculture Extension Lecture Scheme.

Demonstrations and Open Days.

A two-day demonstration of spraying machines and tractors held on 5th and 6th March attracted a record attendance of between 600 and 700. The machines were grouped into two main classes for large and small acreages. It is of interest to recall that some time after the demonstration a letter was received from a grower in Australia asking for particulars of one of the small tractors used at the demonstration of which illustrations had appeared in the press.

An Open Day for Soft Fruits was held on 4th July when the attendance numbered 100, and on 9th September, as we had no top fruit to show our members owing to the May frost, a Conference on Frost Damage was held in the packing shed with Mr. H. V. Taylor in the chair, at which papers were read by Mr. C. E. Cornford and Mr. W. A. Bane. An animated discussion followed in which representatives of the Meteorological Office, of the School of Forestry at Oxford, of the Long Ashton Research Station, of Messrs. George Monro, Ltd., and several prominent fruit-growers took part.

Apart from the organized demonstrations mentioned above, Mr. R. J. Garner's services were requisitioned for three grafting demonstrations in different parts of the country.

Throughout the season members of staff were constantly being called upon to give individual demonstrations to organized parties or to single visitors, objects of particular interest being pruning, stub-grafting, walnut grafting and budding, tree-injection, the use of the categorizer and of the soil moisture recorder.

Conferences.

The Director attended the XIth International Horticultural Congress at Rome in September and visited the chief apple and peach growing districts around Massalombarda.

Several members of Staff attended the Royal Horticultural Society's Soft Fruit Conference in July and either read papers or made contributions towards the discussion, a full report of which has since been published by the Royal Horticultural Society.

Dr. A. M. Massee read a paper on " Strawberry Troubles " at the Conference of Advisory Entomologists at Reading in July, and a paper on the " Control of Codlin by Impregnated Corrugated Cardboard Bands " at the Conference of Advisory Entomologists held in London in December.

In August Mr. Rogers read papers on and demonstrated the working of his patent soil moisture meter at the International Soil Science Congress, Oxford, and at the Empire Meteorological Conference.

In November Mr. Bane read a paper on " Investigations of Frost Damage to Horticultural Crops " at an Agricultural Meteorological Conference held at the Meteorological Office, and Mr. Rogers read a paper on his moisture meter at a Meteorological Observers' Conference held on the same occasion.

Members of Staff also attended and took part in the following Conferences and Meetings in the course of the year : Wye Provincial Conference, Imperial Entomological Conference, British Entomological Congress, Imperial Botanical Conference, Plant Pathology Committee of the British Mycological Society, Association of Economic Biologists, the Ministry of Agriculture's Agricultural Meteorological Sub-Committee, and South-East Federation of Bee-keepers' Annual Conference.

Exhibits.

A comprehensive exhibit dealing with strawberry troubles in Kent was staged at the Chelsea Show, the Cherry and Soft Fruit Show in the R.H.S. Hall, London, the Kent County Agricultural Show at Ashford and the Tunbridge Wells Show. An exhibit dealing with plum rootstocks was staged at the Imperial Fruit Show, Cardiff, 25th October to 2nd November, and an exhibit dealing with our work on walnut culture was staged at the R.H.S. fortnightly meeting in London on 5th November. A small exhibit dealing with rootstocks was sent on loan to the Nature Study Exhibition held by the School Nature Study Union in London in September, and Mr. Moore collaborated with Mr. C. Thorn of the East Sussex County Council in staging an apple scab exhibit in February.

The Worshipful Company of Fruiterers again honoured us with a request for an exhibit of choice fruits for their St. Paul's Day Dinner in January.

Visitors.

The number of visitors received annually at the Station continues to increase. In 1935 the total number recorded was 3,418, representing an increase of over 1,000 on the total for 1934. Visitors were received on 246 days in the year, the busiest months

being March, May, July and September. There were 44 organized parties and 121 visitors from overseas, including 30 different countries. Of individual countries South Africa, Canada, India and New Zealand sent the largest quota of visitors in 1935. Several visitors from overseas came here on the occasion of the International Soil Congress which was held at Oxford in August.

In addition to the periodical visits of students from Wye College, Kent Farm Institute and Swanley College, we received parties from the Royal College of Science, Reading University, and Oxford University.

We were glad to welcome for the first time a party of school teachers from Surrey by arrangement with the County Agricultural Organizer, Mr. J. H. Mattinson. Altogether we received visits from eleven parties of school teachers and from five parties of school children during 1935.

A " Local Day " was held on the day previous to Members' Day again this year in order to give an opportunity to residents in Maidstone and district to see what goes on here. Unfortunately the occasion was marred by very bad weather.

Kent Fruit Soil Survey.

The Joint Report of the Fruit Soil Survey on the Hastings Beds in the High Weald of Kent, conducted in collaboration with the Chemical Department, South-Eastern Agricultural College, Wye, has now been completed and sent forward to the Ministry of Agriculture for publication as a bulletin.

Distribution of Rootstocks and Experimental Material.

Rootstocks.

Over 600 separate consignments were despatched during the year. Owing to the increased productiveness of our comparatively youthful stoolbeds we were able to distribute a record quantity of 375,000 rootstocks. The greater portion of these were distributed to commercial nurseries in the British Isles. Northern Ireland and the Irish Free State between them received 27,000 rootstocks and some 30,000 in all went to Australia, Canada, India, New Zealand, Palestine and South Africa. Twenty other countries as far apart as Finland and Uruguay received one or more experimental consignments of rootstocks and small collections of material.

Trees.

Of the 5,000 trees worked upon selected vegetatively propagated rootstocks which were distributed, 2,700 were planted as field trials on two farms in the Kent fruit areas. By the collaboration of the growers concerned it will be possible to follow up the performance of these trees under commercial conditions. The majority of the remaining 2,300 trees were distributed in definite experimental sets to numerous growers at home and overseas.

Fruits.

The demand from our members for clonal and disease-free bush fruits and raspberries has been as big as ever. Of the 25,000 bush fruits sent out 20,000 were the Station's new black currant Wellington XXX. Clonal " mosaic-free " canes of Lloyd George were distributed to the extent of 15,000 in comparatively small lots mainly for the purpose of providing further nurseries of disease-free cane.

The majority of the clonal " disease-free " Royal Sovereign plants were retained by the Station for further propagation. By October 1936 it is expected that a large supply of plants will be available for distribution. It is then hoped to establish a number of daughter nurseries in isolated positions for further large-scale production. A maximum of 10,000 plants was made available for distribution in lots of 300 or less. The demand for these plants was so heavy that it was not possible to meet all applications in full.

This season has seen the first distribution of clonal blackberries. About 1,000 plants were available and these have, in the main, gone to provide material for further propagation. So far the varieties concerned have been Himalaya, Black Diamond and Parsley-Leaved Berry.

Walnuts.

In 1934 arrangements were made for the nursery trade to take over the propagation of walnuts on a commercial scale. As a few years must necessarily elapse before supplies are available from this new source, the limited number of grafted trees in the nursery at the Research Station was distributed to members in 1935. These were quite inadequate to meet the increasingly large demand. In all, 208 trees were sent out ; of these 144 were planted in the British Isles, 26 in the Empire and 38 in foreign countries.

Hops.

There is still a considerable demand for the new seedling " Brewers' Favourite " (OP. 21) and this season nearly 4,000 sets have been distributed amongst eight growers in Kent, Sussex and Hampshire. Small experimental consignments of " Brewers' Favourite " and other new varieties have also been sent overseas.

Herbarium.

The collections of herbarium specimens which have been housed in the Board Room of the E.M.B. Building since its erection, have continued to prove of great use to members of staff and to postgraduate students. The collections have been added to during the past year, a particularly welcome addition being a set of vegetative shoots of apple and plum rootstocks kindly prepared for us by one of our postgraduate students, Mr. B. Onrubia (Spain).

Station's Publications.

Forty-six scientific papers and four bulletins of a popular nature were published during the year ; the titles and summaries of these papers appear in the Annual Report. A certain number of sets of the Annual Report from 1924 to 1933 inclusive are available on application to the Secretary. A complete list of available publications, together with their price, can also be obtained from the same source.

The Journal of Pomology and Horticultural Science continues to be edited jointly with Professor B. T. P. Barker of Long Ashton—the actual executive work being carried on as heretofore at East Malling. Both Institutes continue to share the financial responsibility, which, thanks to the careful attention to detail given by Miss L. E. Alexander, is causing less anxiety.

LIBRARY.

The Library continues to be administered by the Library Committee in co-operation with the Imperial Bureau of Fruit Production.

We would express our gratitude to Professor W. L. Howard of the University of California for continuing to send us the current numbers of *Science*.

We are indebted to Dr. H. J. Denham for presenting the Library with *Le Bon Jardinier*, to Miss J. Hearman for *The Cobham Journals* for the years 1825-50, to Mr. R. K. Holdsworth for Stockhardt's *Agricultural Chemistry* by A. Henfrey, and to Major W. Tolhurst for additional copies of *The Plums of New York* and *The Peaches of New York* by U. P. Hedrick.

Headley Brothers, 109 Kingsway, London, W.C.2; and Ashford, Kent.